An attempt to Date Text 3 of Enuma Anu Enlil, Tablets 50–51 "Tentative date December 2, − 1878"

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1. Introduction

The Babylonian celestial omens series, "Enuma Anu Enlil," is a group of tablets written in cuneiform that deals with astronomical events and their astrological interpretations. A special section of Enuma Anu Enlil that deals with lunar and solar eclipses is a most fruitful source for the determination of ancient chronology, assuming that the eclipses described are based on actual observations. In 1921 MORRIS JASTROW [1] translated the well-preserved Tablet 21. Ever since, a number of investigators, including LANGDON & FOTHERINGHAM 1928 [2], WEIDNER 1954 [3], SCHAUMBERGER 1956 [4], and REINER & PINGREE 1981 [5] have worked on these tablets. In 1982 PETER J. HUBER [6] refined the eclipse calculations using modern digital computers. He has calculated a lunar eclipse of − 2093 for the patricide eclipse; it refers to the assassination of Shulgi, the king of Ur, by one of his sons.

In this paper it will be shown that the omen in Text 3 of tablets 50–51 of Enuma Anu Enlil uses the Mul-Apin principles of naked-eye astronomy. The principles of the simultaneously rising and setting constellations, and occasionally the heliacal rising of planet Jupiter compared to the setting of some constellations are used (28a, 28b). Text 3 seems to describe an event in which a lunar eclipse is taking place when Mars enters the constellation of Scorpius.

The statement in text 3 points out that the planet Saturn is quite likely to be in the constellation of Corvus. The planet Jupiter is near the bright star Capella, (Mul-Gam), the planet Mercury is in Sagittarius, the planet Mars stands in Scorpius, and the Moon has the same longitude as Orion. Based on the interpretation of data in Text 3 for planets Saturn, Jupiter, Mars, Mercury and Moon, a search is made between − 2500 and − 501. This resulted in a unique solution of the Lunar Eclipse Dec. 2, − 1878. Accepting the date of the lunar eclipse, we may conclude that:

a – The observational techniques with the naked eye discussed in the Mul-APIN Tablets were in use by − 1878, (1879 B.C.), some 180 years before the Venus Tablets were written.

b – The date coincides with the end of the reign of Warad-Sin, and the beginning of the reign of Rim-Sin, the last king of the Larsa dynasty (see below, 11 to 11c).

c – The source material used in Tablets 50–51, studied by REINER & PINGREE [5], probably belongs to the old Babylonian period, about − 1878.

2. Translation of Text 3 by Erica Reiner, with Collaboration of David Pingree. (Comments by V. S. Tuman)

1 – The wagon *is for eclipse*:
   (Indications are that the Omen is based on an eclipse, and the constellation of Ursa Maioris, "The Wagon" is highly visible to an observer during the eclipse.)

2 – The plow is for starting a furrow.
   (AB.SIN. "The Furrow" GOSSMANN 4, the bright star Spica.)   *
   (Then we have):
   (The Plow rises, The Furrow sets):   (R–S), 1**

3 – The Raven is for a steady market.

3a – Saturn is brilliant.
   (Mul.UGA. "The Raven", GOSSMANN 132, Constellation of Corvus)   *
   (Saturn is located in the constellation of Corvus).   (C–C), 1
   [λ (Saturn) = 187° ± 15°, based on vernal equinox 1950]

4 and 5?

6a – Mercury is brilliant, variant, Mercury stands in Pabilsag.   (C–C), 2
   ("PA.BIL.SAG". GOSSMANN 358. Constellation of Saggitarius.)
   (Mercury is in the constellation of Saggitarius.)   (See 7c)

7 – The *False star* is for the rising of wind.

7a – The False star (LuL-La) is the crab (AL.LUL).

7b – "If the front stars of the crab are red: rising of wind."

7c – Mercury stands in it.
   (In statement 6a Mercury was in Pabilsag; now it cannot stand in Cancer; however:)
   (Mercury in PA.BIL.SAG rises, constellation of Cancer sets.)
   [λ (Mercury) = 285° ± 28°, Vernal equinox 1950]   (R–S), 2

8 – The fox is for breaking into houses.

8a – "If Mars approaches the Scorpion, there will be a breach in the palace of the prince."

8b – "If Mars approaches the Scorpion: The city will be taken through a breach."
   (When Mars enters Scorpius, there will be a breach in the palace and trouble in the city.)

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* FELIX GOSSMAN 1950, Planetarium Babylonicum Rom.
** (R–S), 1 means (Rise–Set), case 1 and (C–C), culminate together, *etc.*

9 – The Hired Man is for furrow.
     (If the furrow is Spica as in 2, then:)
     ("Hired Man", Aries rises, Mul.ABSIN sets.)   (R–S), 3
9a – If Jupiter approaches the Crook: the harvest of Akkad will prosper.
     (GAM. "The Crook." GOSSMANN 64. Auriga, Capella.)
     (Jupiter is approaching the bright star Capella.)   (See 13b)
10 and 10a?
11 – The Star of Elam is for cold.
11a – The Star of Elam is Mars, the Anzu-bird.
11b – If the Anzu-bird's star is very red, there will be cold."
11c – The star of Elam is Ninazu, the lord of the earth; it is said with reference
      to Lisi, the Scorpion; Mars stands in it.
      (8b states, if Mars approaches the Scorpion; 11c states that Mars stands
      in the Scorpion).
      (Mars is in Scorpius, it is a bad omen for Elam).   (C–C), 3
11d – "If the Star of Dignity, the vizier of Tispak, approaches the Scorpion: for
      three years there will be severe cold, cough and phlegm will befall the
      land."
12 – The Twins are for devouring by Nergal
     (Mars is related to Nergal, Mars is in Scorpion, hence:)
     (Mars in Scorpius rises, gamma Geminorum, Twins sets)
     $(\lambda \cdot (\text{MARS}) = 255° \pm 15°$, Vernal Equinox 1950]   (R–S), 4
12a – "If the Stranger approaches the Twins: the prince will die."
13 – Ninsi is for the end of the dynasty.
13a – Ninsi is Mars.
13b – 'If the Stranger approaches Jupiter: the King of Akkad will die, and the
      harvest of the land will prosper."
      (12a, 13, 13a and 13b, imply that Mars is the Stranger.)
      (Mars approaches Jupiter.)
      (Mars in Scorpius rises, Jupiter near Capella sets)
      $[\lambda \text{ (Jupiter)} = 80° \pm 15°$, Vernal Equinox 1950]   (R–S), 5
14 – The stars of the sunrise are for the raining of rain.
14a – "If the stars are visible at sunrise: in that year rain and flood will
      persist."
14b – "If planets, either three or four, stand at sunrise one after the other:
      ditto."
      (Oct, 19th – 1878, we have: Mars 166, Venus 179, Moon 185, Mercury
      188, (not visible) and Sun at 191).
15 – to 23?
24 – The star with the woman with the . . . womb . . . cattle.
24a – U SI = epidemic (among cattle).
24b – The Road of the Sun at the foot of the cattle-pen is (the Path) of Ea; the
      Road of the Sun at the middle of the cattle-pen is (the Path) of Anu; the
      Road of the Sun at the head of the cattle pen is (the Path) of Enlil . . .
      (Ea–Winter Solstice),   Mul.Apin Tablet 2;
      (Anu – Fall/Spring Equinox),Mul.Apin Tablet 2;

(Enlil – Summer Solstice),Mul.Apin Tablet 2.
(See also Reiner-Pingree (5) page 17.)

25 – In month II, the Scorpion and . . . to . . . – it says so . . .

26 – In month III, Mars . . . to . . . – it says so . . .

26a – (Mars in front of Capricornus, "SUHUR.MAS"; this line was left out in
the text of Reiner-Pingree)
(Mars in Scorpius and Capricornus, "SUHUR.MAS" rise together simul-
taneously)   (R–R), 1

27 – In month VI, the Kidney and the Yoke rise heliacally.

28 – In month IV, the Arrow, the Twins, (and) the Heroic rise heliacally.
(Arrow and Twins culminate together)   (C–C), 4

28a – The Great Star, the Crab, the Eagle. The Heroic, Jupiter, on a cloudy
day . . . rises heliacally.

28b – The Crab – it says so on account of the Goat-fish, namely, *suhurmasu.*
(Cancer rises heliacally – Capricornus and Aquila set)   (R–S), 6
(Aquila and Capricornus set together)   (S–S), 1
(Jupiter rises heliacally – Capricornus culminates).   (R–C), 1

28c – The Wagon stands all year, namely, it circles around.

29 – In month XII, the Fish, the Fox, (and) the star of
Marduk rise heliacally.

29a – The star of Marduk-it says so on account of Mercury; secondly, the star
of Marduk-it says so on account of the Crook.
(Mercury in PA.BIL.SAG rises – Jupiter in MUL.GAM sets) (R–S), 7

30 – The star that stands after it is the True Shepherd of Anu, Papsukkal; for
an early wind.

30a – "If the Moon is surrounded by a halo and the True Shepherd of Anu
stands within it: the high-lying grounds of the land will prosper."
(Moon and Orion culminate together).   (C–C), 5
(Moon has the same longitude as Orion, λ (Moon) = 90°).

31–36?

It is evident that naked eye observational techniques of simultaneous rising,
culminating and setting; rising-setting, and rising-culminating of two bodies are
used extensively to inform us of the location of planets.

In summary we have:

1 – The Plow rises – The Furrow sets,   (R–S), 1
2 – Saturn and Corvus culminate together,   (C–C), 1
3 – Mercury stands in PA.BIL.SAG.   (C–C), 2
4 – Mercury in PA.BIL.SAG rises, Cancer sets,   (R–S), 2
5 – The Hired Man, Aries rises, Mul.ABSIN sets,   (R–S), 3
6 – Jupiter and Auriga culminate together,   (C–C), 3
7 – The twins are for devouring by Nergal,
8 – Mars in Scorpius rises, gamma Geminorum, Twins set.   (R–S), 4
9 – Mars in Scorpius rises, Jupiter near Capella sets.   (R–S), 5
10 – Mars in Scorpius, and Capricornus rise together,   (R–R), 1

11 – Arrows and Twins culminate together,   (C–C), 4
12 – Cancer rises, Capricornus and Aquila set,   (R–S), 6
13 – Capricornus and Aquila set together,   (S–S), 1
14 – Jupiter rises heliacally, Cancer culminates.   (R–C), 1
15 – Mercury in PA.BIL.SAG rises, Jupiter in MUL.GAM sets   (R–S), 7
16 – If the Moon is surrounded by the halo, and the True Shepherd of Anu
     stands within it: . . .
17 – Moon and Orion culminate together,   (C–C), 5

The Text 3 is designed with a "Theme" Rising-Setting (R–S), 7 times, and
Culminating together (C–C) 5 times.
The "Theme" is also observed among the kudurrus.

3. Technique of Interpretation of the Eclipse, in Text 3

The Interpretation of the eclipse in the Text 3 is based on the following
assumptions:

a – The eclipse is based on real astronomical observation.
b – The text deals with events of a particular year when the Eclipse took place.
   (See 11d.)

To determine the date of the eclipse, first we shall determine the possible times
when the planets had the configurations indicated in the text.
   Table 1, below, is used as input data for the search program. The program
goes through the tables of data from year − 2500 to − 501, which are cal-
culated at three day intervals and stored on a hard disk. The Vernal Equinox of
1950 is corrected for the precession. In this manner compatible longitudes are
assigned to the planets and then compared to the tables of planetary data from
− 2500 to − 501, for a period of 2000 years. The computer is asked to find the
dates when Saturn, Jupiter, Mars, Mercury and Moon had the same configura-
tion recorded in Table 1. The search program finds three different years:
− 1938, − 1878, and − 1024.

Table 1. The input data.
Referred to Vernal Equinox of 1950.
From Text 3 of Enuma Anu Enlil

Search Priority	Planet Field	Longitude Coordinates	Angular Deviation
1	7 – Saturn	187	± 15
2	6 – Jupiter	80	± 15
3	5 – Mars	255	± 15
4	3 – Mercury	285	± 28
5	1 – Moon	90	± 45

1-Moon, 2-Sun, 3-Mercury, 4-Venus, 5-Mars, 6-Jupiter, 7-Saturn.

Table 2. Output Data from the Search Program

M	D	Yr.	Moon	Sun	Mercury	Venus	Mars	Jupiter	Saturn
Nov.	7,	− 1938	26	209	208	212	202	14	132
Nov.	10,	− 1938	72	212	212	216	204	14	132
Dec.	1,	− 1878	28	234	253	190	196	38	146
Dec.	4,	− 1878	71	237	256	192	198	38	146
Dec.	28,	− 1878	24	262	241	215	216	36	146
Nov.	11,	− 1024	33	220	219	183	203	52	154
Nov.	14,	− 1024	70	223	224	187	205	51	154
Dec.	8,	− 1024	29	248	262	216	223	48	155
Dec.	11,	− 1024	66	251	267	220	225	48	155

Table 3. Lunar Eclipse

Longitude 44.5 Latitude 32.5
− 1878 Dec.   2 22.80 UT,
ET−UT = 12.2062 hours

Contact	UT	LT	ALT	
1	20.88	23.94	76.70	MR : 16.83
2	21.96	1.02	70.54	SS : 17.20
3	23.60	2.66	52.01	SR : 6.80
4	.68	3.74	38.84	MS : 7.10

MR = Moon Rise	SR = Sun Rise	UT = Universal Time
MS = Moon Set	SS = Sun Set	LT = Local Time
	ALT = Altitude	

These results are given in Table 2 below. The test for eclipses provided no Solar eclipse, but one total Lunar Eclipse on 2nd Dec. − 1878, (see Tables 1, 2, and 3).

The text used has several omens for Akkad and the principal manuscript comes from Assurbanipal's library, so the bracket { − 2500 to − 501} certainly is sufficient for this study.

Discussion of the Results

Tablets 50–51, and specifically Text 3 of the Enuma Anu Enlil series, contain information that is also quoted in the Mul.Apin Tablets. This fact was known to REINER & PINGREE.

Back in 1879 B.C. the north pole was very close to the star alpha Draconis, also known as Thuban. The brightest constellation near the northpole was

Ursae Maioris, "*The Wagon*". Across the pole was the less spectacular Ursa Minoris. At the time of the lunar eclipse, both of the constellations were visible to the naked eye, with Ursa Maioris being much more spectacular. These two constellations were circumpolar and visible all the year round. Furthermore the longitude of the lunar eclipse quoted in this study lies a few degrees from the brightest star Alpha Maioris, also known as Dubha.

Calculations and the plots of the polar constellations were performed at my request by BARBARA WELTHER of Smithsonian Institution, Astrophysical Observatory, Harvard University. (See Figure 1.)

This investigation began in 1987, and the eclipse of − 1878 was calculated during my visit to Oxford University. The study was concluded in Tübingen and Turlock. The results indicate that the omen of Text 3 is based on a lunar eclipse that took place in − 1878. The omen may be interpreted as: *Rim-Sin takes over the kingdom of Larsa from his brother Warad-Sin in − 1878.* This result is based on the long chronology (6, 9, 10). Warad-Sin and Rim-Sin were the sons of Kudur Mabuk who was the Sheik of Emutbal, presumably of Elamite origin. According to the omen, Rim-Sin assumes the kingdom of Larsa by a breach in the palace of the prince (see 8a, 8b, 11, 11a, 11b, and 11c of the
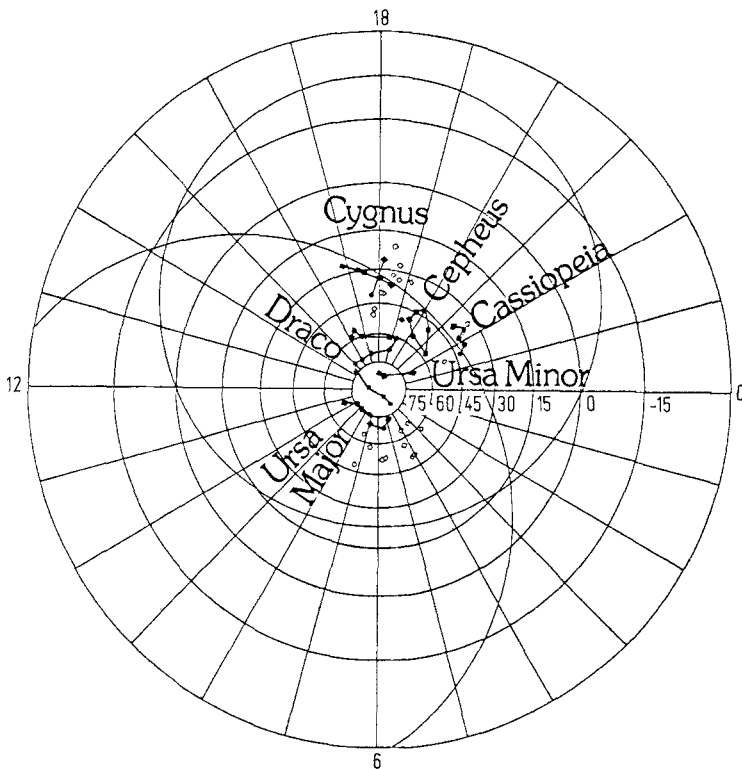

Figure 1. Celestial Planisphere, Epoch 1879 BC. Calculation done by
BARBARA L. WELTHER

omen). The long 60 year reign of Rim-Sin in Larsa was brought to an end when Hammurabi conquered Larsa, terminating the period of peaceful co-existence with city states in southern Mesopotamia (7). The interpretation of the omen appears to be well confirmed by the statement made in *Bibliotheca Mesopotamica*, Volume 2, Fascicule 2:

"The original corpus of omens, then, probably dates back considerably earlier than ca. − 1000, possibly to the Old Babylonian period at the beginning of the second millennium B.C."

The unique total-lunar-eclipse of Dec. 2nd, − 1878 was found over a 2000 year period from − 2500 to − 501; it also indicates clearly that the techniques of naked-eye astronomical observation were already in use when EAE 50/51 Text 3 was inscribed. My estimated date for a conjunction of Venus, Mars, Saturn and Mercury, mentioned in Mul-Apin Tablet 1, is December 15th − 2047*; this is 169 years before the EAE 50/51 Text 3, was composed. We also note that a planetary conjunction cited among the stars of Anu, in Mul.Apin Tablet 1, happened some 346 years before the Enuma-Anu-Enlil Tablet 63, also known as "The Venus Tablet Omens of Ammisaduqa", was composed. It seems plausible that the involvement of the astronomer-priests with eclipse omens, and their general interest in astrology from the time of Sargon of Akkad, led to a long investigation of events in the sky. During some 500 years of study, ancient observers were able to accumulate precise data about the movements of the five objects, Saturn, Jupiter, Mars, Mercury, and Moon which in turn enabled me to calculate the lunar eclipse of − 1878.

It is very interesting to observe that the "Motif" composed about 1879 B.C. which led to discovery of the eclipse was:

(Rising–Setting), (R–S) 7 times
and simultaneous culmination, (C–C) 5 times.

Some 745 years later this "Motif" is again used during the reign of king Nabuchadnezzar I, on the kudurru B.M. 90858. In this case we have:

(Rising–Setting), (R–S) 6 times
and simultaneous culmination (C–C), 3 times.

These two documents may be considered as two pages of the history of Assyro-Babylonian Astronomy.

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* WERNER PAPKE in his Ph.D Thesis 1978, proved that Mul.Apin Tablet 1 was based on observations made about 2300 B.C.

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However, I take complete responsibility for the content of this paper.

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